microwaves having a high enough field strength and being applied for a short enough time to cause differential thermal expansion between materials of different phases to cause weakening between phases whilst avoiding causing significant chemical changes to the ore, or at least to the mineral to be extracted.

28. (New) A method according to claim 27 wherein said ore is exposed to high field strength microwaves for a time of less than 0.01 second.

29. (New) A method of microwave pre-treatment of a multi-phase material prior to a subsequent operation on the material to extract one material from the others, the method comprising providing a continuous feed of the multi-phase material through a region in which applied microwave radiation is present, at a speed to allow a throughput of multi-phase material of at least 500 tonnes per hour, said microwave radiation creating a power density of at least 10^{15} Wm^{-3}, said material experiencing said microwave radiation for a time of the order of 1ms or less, during which time it experiences one or a plurality of pulses of energy, and wherein the overall bulk temperature of the multi-phase material does not rise by more than 40°C, and wherein thermal stress is created between phase boundaries which is large enough to cause inter phase fracturing, and wherein the temperature of said phases of said multi-phase material is kept low enough to avoid significant changes to the chemical properties of said different phase materials.

30. (New) A method according to claim 29 wherein the or each said pulse has a duration of the order of not more than microseconds.

31. (New) Apparatus for continuous processing of ore or rocks comprising means for applying high power density microwaves, or high electric field strength microwaves, on a continuous basis to ore or rocks passing through a microwave cavity or zone to weaken said ore or rocks, and feed means adapted to pass subsequently said continuous flow of said ore or rocks to a mechanical treatment machine adapted mechanically to break up said ore or rocks.

32. (New) A method of continuous processing of ore or rocks comprising applying at least one of (i) high power density microwaves, or (ii) high/electric field strength microwaves, on a continuous basis to ore or rocks passing through a microwave cavity or zone to weaken said ore or rocks at a speed that is fast enough to avoid causing substantial chemical change to said ore or rocks, and subsequently passing said continuous flow of ore or rocks to a mechanical treatment machine and mechanically breaking up said ore or rocks.

33. (New) A method of microwave pre treatment of a multi-phase material prior to a subsequent operation on the material, said material having a first phase of material and a second phase of material, the method comprising heating said material with microwaves, producing a power density of at least $10^9 Wm^{-3}$ in a continuous process in which said material moves into and through a microwave treatment area and experiences exposure to said microwaves in said

treatment area for a time of the order of ½ second or less, said time being a short enough time to avoid causing substantial chemical changes to one, or both of said phases of said multi-phase material, and passing said material out of said treatment area for said subsequent operation.

34. (New) A method according to claim 33 wherein said material experiences microwaves in said treatment area for a time selected from the group consisting of: (i) of the order of 0.1 second or less; (ii) of the order of 0.01 second or less; and (iii) of the order of 0.001 second or less.

35. (New) A method according to claim 27 wherein pulses of microwaves are emitted substantially continuously and said pulses have a duration from the group consisting of (i) of the order of 1μs or less; (ii) of the order of 10μs or less; (iii) of the order of 100μs or less; (iv) of the order of 1ms or less; and (v) of the order of 10ms or less; of the order of 100ms or less.

36. (New) A method according to claim 35 wherein said substance, whilst in said treatment area, experiences a series of pulses of energy, said series having a number of pulses selected from the group consisting of: (i) of the order of 100 pulses or more; (ii) of the order of 50 pulses or more; (iii) of the order of 10 pulses or more; (iv) of the order of 5 pulses or more; (v) of the order of 2 pulses or more; and (vi) of the order of one pulse.

37. (New) A method according to claim 36 wherein said power density produced by the microwaves in the treatment area is selected from the group consisting of the order of (i) $10^{15}Wm^{-3}$ or more; and (ii) $10^{16}Wm^{-3}$ or more.

38. (New) A method according to claim 34 wherein the bulk temperature of said material is raised by a temperature selected from the group consisting of: (i) less than 200°C; and (ii) less than 150°C; whilst said material is in said treatment area.

39. (New) A method according to claim 38 wherein said bulk temperature of said material is raised by a temperature selected from the group consisting of: (i) of the order of, or less than: (i) 50°C; (ii) of the order of, or less than 20°C; and (iii) of the order of, or less than 10°C.

40. (New) A method according to claim 34 wherein said material flows through said treatment area at a rate of at least 100 tonnes an hour.

41. (New) A method according to claim 40 wherein said material flows through said treatment area at a rate of the order of 1000 tonnes an hour or more.

42. (New) A method according claim 34 wherein said first phase comprises a desired mineral and said second phase a rock substrate surrounding said mineral, and wherein said

microwave energy significantly weakens the bond strength between said mineral and said surrounding substrate by causing local differential thermal expansion.

43. (New) A method according to claim 42 wherein said microwave energy is applied to said material for a short enough time to avoid causing substantial chemical changes to (i) said mineral; and/or (ii) both said material and substrate, that would detrimentally influence the efficiency of subsequent separation of said mineral and substrate.

44. (New) A method according to claim 33 wherein said first phase comprises a mineral and said second phase comprises water, and wherein said pre-treatment comprises dehydration, said electromagnetic energy drying said mineral.

45. (New) A method according to claim 44 wherein said microwaves also cause directly or indirectly fracturing or weakening of said mineral.

46. (New) A method according to claim 45 wherein said first phase comprises a hydrated mineral selected from the group consisting of: (i) coal; (ii) other hydrated material.

47. (New) A method of separating a mineral from an ore comprising pre-treating the ore in accordance with claim 33 and subsequently comminuting said ore.

48. (New) A method according to claim 34 wherein the power density within the treatment area produced by said microwaves is selected from the group consisting of the order of 10^{10} Wm^{-3}, or more; 10^{11} Wm^{-3}, or more; 10^{12} Wm^{-3}, or more; 10^{13} Wm^{-3}, or more, 10^{14} Wm^{-3}, or more; and 10^{15} Wm^{-3}, or more.

49. (New) A method of recycling articles which have parts made of different materials in them comprising pre-treating said articles in accordance with claim 33 and then mechanically stressing said articles in order to break them up and facilitate the extraction of parts of said articles.

50. (New) Apparatus for microwave treatment of material comprising:

a microwave treatment zone;

a microwave emitter disposed at said treatment zone;

a material transporter adapted to transport material through the treatment zone; the arrangement being such that:-

the emitter is adapted to emit microwaves that create a power density of at least $10^{9}Wm^{-3}$;

and the material transporter is adapted to transport said material through the treatment zone fast enough so that said material experiences significant microwaves in said zone for a time of the order of ½ second or less, said time being short enough to avoid causing substantial chemical change to said material.

51. (New) Apparatus according to claim 50 wherein said emitter is adapted to create a power density of microwaves in said treatment zone of at least $10^{15}Wm^{-3}$.

52. (New) Apparatus according to claim 51 adapted to cause said material to experience microwaves for a time selected from the group consisting of (i) of the order of 0.1 second or less; (ii) of the order of 0.01 second or less; and (iii) of the order of 0.001 second or less.

53. (New) Apparatus according to claim 52 adapted to transport of the order of 1000 tonnes of material an hour through said treatment zone.

54. (New) Apparatus according to claim 52 wherein said emitter is adapted to produce microwave pulses with a duration selected from the group consisting of (i) of the order of a microsecond; (ii) of the order of tens of microseconds; and (iii) of the order of hundreds of microseconds, or less.

55. (New) Apparatus according to claim 54 adapted to apply many pulses of microwaves to said material, whilst said material is in said treatment zone.

56. (New) A method according to claim 32 wherein the exposure of said ore or rocks to said high field strength microwaves is for a time selected from the group consisting of: (i) of the order of half a second or less; (ii) of the order of a quarter of a second or less; (iii) of the order of 0.1 second or less; and (iv) of the order of 0.01 seconds or less.